

BAKERY EQUIPMENT

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WAC 296-302-010 Bakery equipment-General requirements.

- (1) Application. The requirements of this chapter shall apply to the design, installation, operation and maintenance of machinery and equipment used within a bakery.
- (2) These standards shall be augmented by the Washington state general safety and health standards, and any other regulations of general application which are or will be made applicable to all industries.

WAC 296-302-010 (Cont.)

- (3) The provisions of this chapter shall prevail in the event of a conflict with, or duplication of, provisions contained in chapters 296-24, 296-62, and 296-800 WAC.
- (4) WAC 296-24-012 and 296-800-360, shall apply where applicable to this industry.
[Statutory Authority: RCW 49.17.010, .040, .050. 01-11-038 (Order 99-36) § 296-302-010, filed 05/09/01, effective 09/01/01. Order 74-17, § 296-302-010, filed 5/6/74.]

WAC 296-302-015 Definitions.

- (1) **“Dumphin and blender”** applies to those elements of a flour handling system in which flour in bags is first emptied for distribution.
- (2) **“Flour elevator”** means the conveyor which is used to convey flour in a vertical direction and it includes bucket, spiral screw, or bulkflow conveyors.
- (3) **“Screw conveyor”** means the conveyor which is used to convey flour in a horizontal or inclined plane by means of a continuous spiral screw enclosed in a suitable casing which follows the same general contour of the perimeter of the screw.
- (4) **“Bolting reel”** means a device in which the flour is screened through a rotating drum.
- (5) **“Sifter”** means a device in which flour is sifted. It may be of the brush, oscillating, or vibrating type.
- (6) **“Flour scale”** means a scale for weighing flour.
- (7) **“Flour gate”** means the device or devices used to control the delivery of flour.
- (8) **“Direct fired ovens”** are ovens which burn fuel directly inside the baking chamber.
- (9) **“Direct recirculating ovens”** are ovens which have heating systems consisting of one or more heaters (located inside or outside the baking chamber), each heater being equipped with a burner, the products of combustion of which are mixed with spent gases returned from the oven. Combustion gases are circulated through the heater and oven chamber by a fan. An overflow or vent removes part of the spent combustion gases to compensate for fresh combustion gases added by the burner.
- (10) **“Flue-type ovens”** are ovens which burn fuel in a furnace which is connected through flues which carry the combustion gases to stack.
- (11) **“Indirect multiple-burner ovens”** are ovens which are heated by burners (usually gas) which are totally enclosed in such a way that unburned gases or products of combustion cannot enter the baking chamber.
- (12) **“Steam-tube ovens”** are ovens which are heated by a group of tubes which are partially filled with liquid and sealed at both ends. A small part of each tube is exposed to the heat of a furnace and the larger part placed inside the baking chamber. Heat is transmitted by evaporating liquid in the furnace end of the tube. Steam thus formed travels to the other end of the tube, where the steam condenses and returns to the furnace by gravity.
- (13) **“Indirect recirculating ovens”** are ovens which are equipped with a gas tight duct system, a furnace, and a circulating fan. Gases of combustion are circulated through this enclosed system and mixed with fresh combustion gases generated by the burner in the combustion chamber. A vent or overflow removes a portion of the gases to compensate for the fresh gases added by the burner. No unburned gases or products of combustion have access to the baking chamber.

WAC 296-302-015 (Cont.)

- (14) **“Electric ovens”** are ovens which are heated entirely by passing an electric current through resistance elements.
- (15) **“NFPA”** means National Fire Protection Association.
[Order 74-17, § 296-302-015, filed 5/6/74.]

WAC 296-302-020 General machine guarding.

- (1) Electrical grounding. The frame of each machine which is driven by an electric motor or has any electrical connection shall be effectively grounded.
- (2) Gears. Refer to WAC 296-24-150, machinery and machine guarding of the general safety and health standards, chapter 296-24 WAC.
- (3) Removable covers or guards. Any covers or guards which must be removed for cleaning and adjustment shall be made easily removable in order that they may be removed and replaced with the least effort.
- (4) Ventilation through machine guards. Where it is necessary to guard motors or other equipment which require ventilation, guards should be so designed that they will not restrict the circulation of the air.
[Order 74-17, § 296-302-020, filed 5/6/74.]

WAC 296-302-025 Flour-handling equipment-Scope and application.

All sections of this chapter which include WAC 296-302-025 in the section number, apply to flour-handling equipment.
[Order 74-17, § 296-302-025, filed 5/6/75.]

WAC 296-302-02501 General requirements for flour-handling.

- (1) Wherever any of the various pieces of apparatus comprising a flour-handling system are run in electrical unity with one another the following safeguards shall apply:
- (a) Each apparatus shall be safeguarded by a disconnecting means for the motor circuits as required by National Electrical Code - 1971 edition.
 - (b) Wherever a flour-handling system is of such size that the beginning of its operation is far remote from its final delivery end, all electric motors operating each apparatus comprising this system shall be controlled at each of two points, one located at each remote end, either of which will stop all motors.
 - (c) Motor control switches shall be capable of being locked in the open position.
 - (d) Control circuits for magnetic controllers shall be so arranged that the opening of any one of several limit switches, which may be on an individual unit, will serve to de-energize all of the motors of that unit.
- (2) Removable covers on all flour-handling equipment shall be so designed that the lifting effort shall not be more than 50 pounds.
- (3) Wherever flour-handling systems are of large construction, suitable walkways or platforms or both shall be constructed around and over bins and apparatus, in accordance with the applicable requirements of the general safety and health standard, chapter 296-24 WAC and safety and health core rules, chapter 296-800 WAC.

WAC 296-302-02501 (Cont.)

- (a) All walkway surfaces shall be maintained in nonslip condition.
 - (b) Elevated walkways shall have railings and toeboards in compliance with applicable requirements of the general safety and health standard, chapter 296-24 WAC and safety and health core rules, chapter 296-800 WAC.
 - (c) All ladders leading to upper walkways shall be in accordance with the applicable requirements of the general safety and health standard, chapter 296-24 WAC and safety and health core rules, chapter 296-800 WAC.
 - (d) Wherever walkways are near the ceiling construction of the building, where obstruction to head room is lower than normal standing height, methods shall be provided to warn any occupant of the walkway. This should be done by means of "tell tales" or other suitable means located ahead of the obstruction. Suitable signs shall also be placed on walkways warning occupants of possible danger.
- (4) All oscillating and vibrating sifters shall be protected with guard rails in compliance with applicable requirements of the general safety and health standard, chapter 296-24 WAC and safety and health core rules, chapter 296-800 WAC.
 - (5) All mechanical transmission shafting, gearing, and sprocket drives shall be completely guarded, preferably with dust-tight housing. Lubrication fittings shall extend to the outside of the guard.
 - (6) All guards shall be readily removable.
 - (7) All flour-handling equipment, each individual unit or the entire system collectively, shall be so constructed that all interior or exterior protruding corners are of a rounded nature.
 - (8) When Class II hazardous conditions prevail, electric motors, motor controllers, and switches shall be of the type approved for such locations in accordance with the requirements of the National Electric Code - 1971 edition.

[Statutory Authority: RCW 49.17.010, .040, .050. 01-11-038 (Order 99-36) § 296-302-02501, filed 05/09/01, effective 09/01/01. Order 74-17, § 296-302-02501, filed 5/6/74.]

WAC 296-302-02503 Bag chutes and bag lifts (bag-arm elevators).

- (1) Bag chutes (gravity chutes for handling flour bags) shall be so designed so as to keep to a minimum the speed of flour bags. If the chute inclines more than 30° from the horizontal, there shall be an upturn at the lower end of the chute to slow down the bags.
- (2) Bag-arm elevators with manual takeoff shall be designed to operate at a capacity not exceeding seven bags per minute. The arms on the conveyor chain shall be so spaced as to obtain the full capacity of the elevator with the lowest possible chain speed. There shall be an electric limit switch at the unloading end of the bag-arm elevator so installed as to automatically stop the conveyor chain if any bag fails to clear the conveyor arms.
- (3) The conveyor chain on bag-arm elevators shall travel in a suitable structure and all drums shall be completely guarded, so that in case of a broken chain link the remainder of the chain will remain within its guides.

- (4) Manlifts shall not be used in bakeries. Bag or barrel lifts shall not be used as manlifts.

[Order 74-17, § 296-302-02503, filed 5/6/74.]

WAC 296-302-02505 Dumpbin and blender.

- (1) The dumpbin or blender shall be constructed of metal or other nonsplintering material.
- (2) Openings shall be protected by means of bars or grids. If grids are made of mesh, the openings shall be not more than 3 inches in either length or width. If parallel bars or rods are used, they shall be spaced not more than 3 inches apart on centers.
- (3) Hinged dumpbin covers shall be provided with locks or latches to hold the covers in the open position, so that they will not accidentally fall down while the dumpbin is in operation.
- (4) Dumpbins and blenders shall be so constructed that no separate pits in floors shall be required at the point which connects the final discharge to the usual elevator.
- (5) All dumpbin and blender hoods shall be of sufficient capacity to prevent circulation of flour dust outside the hoods.
- (6) All dumpbins shall be of such a height from the floor as to enable the operator to dump flour from bags, without causing undue strain or fatigue. Where the edge of any bin is more than 24 inches above the floor, a bag rest step shall be provided.
- (7) A control device for stopping the dumpbin and blender shall be provided close to the operator's work station.
- (8) A screen shall be provided in the suction nozzle over the bin or blender to prevent sacks that are being cleaned from getting into the rotor of the dust collecting fan.

[Order 74-17, § 296-302-02505, filed 5/6/74.]

WAC 296-302-02507 Flour elevators.

- (1) Flour elevators shall be constructed of metal or other nonsplintering material.
- (2) All removable sections of the elevator casing shall be equipped with stationary clamps for quick removal, or shall be equipped with equivalent locking devices which contain no loose parts which may become detached from either the casing or the cover.

[Order 74-17, § 296-302-02507, filed 5/7/74.]

WAC 296-302-02509 Bolting reels.

- (1) Bolting reels shall be constructed of metal or other nonsplintering material, with the exception of the bolting cloth.
- (2) Refuse tailing spouts shall be readily accessible and shall be located at a safe distance from moving parts.

[Order 74-17, § 296-302-02509, filed 5/6/74.]

WAC 296-302-02511 Storage bins.

- (1) Storage bins shall be constructed of metal or other nonsplintering material.
- (2) Storage bins shall be provided with gaskets and locks or latches to keep the cover closed, or other equivalent devices in order to ensure the dust tightness of the cover. Covers at openings where an employee may enter the bin shall also be provided with a hasp and a lock, so located that the employee shall lock the cover in the open position whenever it is necessary to enter the bin.

WAC 296-302-02511 (Cont.)

- (3) Storage bins where the side is more than 5 feet in depth shall be provided with standard stationary safety ladders, both inside and outside, to reach from floor level to top of bin and from top of bin to inside bottom, keeping the ladder end away from the moving screw conveyor.
- (4) Loading distribution conveyors shall be located in top of bin centrally unhoused, and all covers for entrance to the bins shall be located away from the loading distribution conveyor.
- (5) An electric limit switch or other suitable protective device shall be provided in the top of the bin centrally over the loading screw conveyor on the opposite end of the flour entrance opening. It shall be so designed as to stop the loading screw if an excessive amount of flour is delivered to the bin.
- (6) The main entrance cover of large storage bins located at the interior exit ladder shall be provided with an electric interlock for motors operating both feed and unloading screw, so that these motors cannot operate while the cover is open.

[Order 74-17, § 296-302-02511, filed 5/6/74.]

WAC 296-302-02513 Screw conveyors.

- (1) Screw conveyors shall be constructed of metal or other nonsplintering material.
- (2) Each dead-end screw conveyor shall be provided with an overflow safety gate which will operate an electric limit switch to shut down the conveyor before dangerous pressure of material is built up at the dead end.
- (3) The covers of all screw conveyors shall be made removable in convenient sections, held on with stationary clamps located at suitable intervals keeping all covers dust-tight. Where drop or hinged bottom sections are provided this provision shall not apply.

[Order 74-17, § 296-302-02513, 5/6/74.]

WAC 296-302-02515 Sifters.

- (1) Enclosures of all types of flour sifters shall be so constructed that they are dust-tight but readily accessible for interior inspection.
- (2) Oscillating and vibrating sifters shall be so constructed that all moving parts are well within the outer frame of the apparatus.
- (3) Refuse tailing spouts of all types of sifters shall be readily accessible and shall be located at a safe distance from moving parts.

[Order 74-17, § 296-302-02515, filed 5/6/74.]

WAC 296-302-02517 Flour scales.

- (1) Flour scales shall be constructed of metal or other nonsplintering material.
- (2) Where a transparent covering is provided over dial scales it shall be made of a nonshatterable transparent material.
- (3) Traveling or track-type flour scales shall be equipped with bar handles for moving same. The bar should be at least 1 inch in diameter. Trolley track wheels shall be guarded.
- (4) All moving trolley wheels located within 8 feet 6 inches of floors or platforms shall be fully guarded on sides and ahead of rotating motion.

WAC 296-302-02517 (Cont.)

- (5) The scale cutoff switch shall be totally enclosed and connected to the scale beam in such a manner as to protect the operator from contact.

- (6) Where two or more scales are used on traveling flour scales, interlocks shall be provided so that the gate will not open unless the hopper is below.

[Order 74-17, § 296-302-02517, field 5/6/74.]

WAC 296-302-02519 Automatic flour gates. Automatic flourgate equipment shall be constructed of metal or other nonsplintering material.

[Order 74-17, § 296-302-02519, filed 5/6/74.]

WAC 296-302-03001 Horizontal dough mixers.

- (1) Mixers with external power application shall have all belts, chains, gears, pulleys, sprockets, clutches, and other moving parts completely enclosed.
- (2) Mixers with built-in power units shall have all drive elements enclosed in such a manner as to prevent injury to operators or maintenance personnel performing their normal duties.
- (3) Each mixer shall be equipped with an individual motor and control, and with a conveniently located manual switch to prevent the mixer from being started in the usual manner while the machine is being serviced and cleaned.
- (4) All electrical control stations shall be so located that the operator must be in full view of the bowl in its open position. Such controls, other than a stop switch, shall not be duplicated.
- (5) All mixers with power and manual dumping arrangements shall be equipped with safety devices which shall:
 - (a) Engage both hands of the operator, when the agitator is in motion under power, and while the bowl is opened more than one-fifth of its total opening.
 - (b) Prevent the agitator from being started, while the bowl is more than one-fifth open, without engaging both hands of the operator;
 - (c) Permit the operator to have a full view of the bowl opening while he is in the act of maintaining operation of the agitator at any time while the bowl is more than one-fifth open.
- (6) Mixers with power dumping devices shall be arranged so that the bowl opening cannot be closed beyond four-fifths of its total opening unless the operator maintains the control contact which causes the dump motor to complete the bowl closure. Alternatively the control may be so arranged that the operator must keep at least one hand engaged, by holding in a push button, during the entire closure of the mixing bowl.
- (7) Mixers shall be provided with flour-gate operating mechanisms, ingredient openings, and water inlets, which can be conveniently manipulated by the operator from the normal area of activity (either platform or floor) without requiring abnormal reaching, or improvisations which might jeopardize his safety.
- (8) Every mixer shall be equipped with a full enclosure over the bowl which is closed at all times while the agitator is in motion. Only minor openings in this enclosure, such as ingredient doors, flour inlets, etc., each representing less than 1 1/2 square feet in area, shall be capable of being opened while the mixer is in operation.

WAC 296-302-03001 (Cont.)

- (9) No loose access doors and covers weighing more than 2 pounds shall be used on mixers. Such parts shall be hinged or otherwise held in proximity to the openings that they cover.
- (10) Overhead covers or doors which are subject to accidental closure shall be counterbalanced to remain in an open position or provided with means to hold them open until positively released by the operator.
- (11) Provision shall be made to bolt mixers solidly to the floor to prevent dislocation or excessive vibration. Open space between mixers and platforms which may endanger the operator shall be guarded.
- (12) Mixers shall be installed only on substantial foundations which are capable of safely withstanding the live loads incurred in full-capacity mixing operations.
- (13) Access for lubrication at all points shall be provided so as to avoid contact between the lubricating device or the operator's hands and any moving parts.
- (14) Any device or mechanism used to return "sponges" to a mixer shall be so interlocked with the mixer as to prevent injury to the operator.
- (15) No electrical pilot or control circuits shall be employed at a potential in excess of 240 volts.
- (16) A motor-running overcurrent protective device shall be provided for each motor. Undervoltage protection shall be provided in all magnetic controllers.
- (17) Positive means shall be provided to prevent application of pressure above the design maximum in all mixer cooling jackets.
- (18) Valves and controls to regulate the coolant in mixer jackets shall be located so as to permit access by the operator without jeopardizing his safety.

[Order 74-17, § 296-302-03001, filed 5/6/74.]

WAC 296-302-03003 Vertical mixers.

- (1) Vertical mixers shall comply with WAC 296-302-03001 (1), (2), (3), (9) through (13), (15) through (17).
- (2) Positive means shall be provided to prevent injury to the operator during speed-change manipulation.
- (3) Bowl locking devices shall be of a positive type which require the attention of the operator for unlocking.
- (4) Devices shall be made available for moving bowls weighing more than 80 pounds with contents, into and out of the mixing position on the machine.

[Order 74-17, § 296-302-03003, filed 5/6/74.]

WAC 296-302-035 Dividers.

- (1) Pinch and shear points. All pinch points and shear points from reciprocating or rotating parts of the divider shall be enclosed or guarded, to protect the operator's hands and fingers from these hazards.
- (2) Front guards. Guards at front of a divider shall be so arranged that the weight of dough can be adjusted without removing the guard.

WAC 296-302-035 (Cont.)

- (3) Rear of divider. The back of the divider shall have a complete cover to enclose all of the moving parts, or each individual part shall be enclosed or guarded to remove the separate hazards. The rear cover shall be provided with a limit switch in order that the machine cannot operate when this cover is open. The guard on the back shall be hinged so that it cannot be completely removed and if a catch or brace is provided for holding the cover open, it shall be designed so that it will not release due to vibrations or minor bumping whereby the cover may drop on an employee.
- (4) Oil holes in knife. The oil holes in the knife at the back of the divider shall be of a maximum width opening of 1/4 inch so an employee's finger cannot go through the hole.
- (5) Knife actuating arm. There shall be a saddle guard or other protective device on any elongated hole in the knife actuating arm at the back of the divider.
- (6) Shear pins. Dividers shall be equipped with mechanical overload release devices such as shear pins.
[Order 74-17, § 296-302-035, filed 5/6/74.]

WAC 296-302-040 Moulders.

- (1) Hoppers. Mechanical feed moulders shall be provided with hoppers so designed and connected to the proofer that an employee's hand cannot get into the hopper where they will come in contact with the in-running rolls.
- (2) Hand-fed moulders. Hand-fed moulders shall be provided with a belt-feed device or the hopper shall be extended high enough so that the hands of the operator cannot get into the feed rolls. The top edge of such a hopper shall be well rounded to prevent injury when it is struck or bumped by the employee's hand.
- (3) Stopping devices. There shall be a stopping device within easy reach of the operator who feeds the moulder and another stopping device within the reach of the employee taking the dough away from the moulder.
- (4) Cleanout holes. Machines shall be so designed or guarded that there is no shear point in close proximity to the cleanout holes.
- (5) Rear of moulders. At the rear of moulders all revolving shafts shall have round corners or cylindrical surfaces, and all bolts shall be flush. Tie rods shall be far enough from revolving parts to prevent a shearing or pinching hazard.
- (6) Adjustment crank. Where a removable crank is used to adjust the moulder for different sizes of loaf, brackets shall be provided on the side of the machine for holding the crank when it is not in use.
[Order 74-17, § 296-302-040, filed 5/6/74.]

WAC 296-302-045 Manually fed dough brakes.

- (1) Top-roll protection. The top roll shall be protected by a heavy gage metal shield extending over the roll to go within 6 inches of the hopper bottom board. This shield may be perforated to permit observation of the dough entering the rolls.
- (2) Emergency stop bar. An emergency stop bar shall be provided, so located that the body will press against it if the operator should fall forward, and this pressure shall positively open a circuit which will deenergize the drive motor in case of an emergency. In addition, a magnetic, spring set brake shall be deenergized at the same time, causing the rolls to stop instantly. The emergency stop bar shall be activated prior to each shift to check if it is functioning properly.

[Order 74-17, § 296-302-045, filed 5/6/74.]

WAC 296-302-050 Miscellaneous equipment.

- (1) Proof boxes. All door locks shall be operable both from within and outside the box. Guide rails shall be installed to center the rack as it enters, passes through, and leaves the proof box.
- (2) Fermentation room. Fermentation room doors shall have nonshatterable wire glass or plastic panels for vision through doors.
- (3) Troughs. Troughs shall be mounted on antifriction bearing casters thus making it possible for the operator to move and direct the motion of the trough with a minimum of effort.
- (4) Hand trucks.
 - (a) Casters shall be set back from corners to be out of the way of toes and heels, but not far enough back to cause the truck to be unstable.
 - (b) A lock or other device shall be provided to hold the handle in vertical position when the truck is not in use.
- (5) Lift trucks. A lock or other device shall be provided to hold the handle in vertical position when the truck is not in use.
- (6) Racks.
 - (a) Sharp splintered or rough corners and edges shall be eliminated.
 - (b) Racks shall be equipped with handles so located with reference to the frame of the rack that no part of the operator's hands extends beyond the outer edge of the frame when holding onto the handles.
 - (c) Antifriction bearing casters shall be used to give the operator better control of the rack.
 - (d) End guards shall be used at shelf levels on proofing racks.
- (7) Conveyors.
 - (a) Wherever a conveyor passes over a main aisleway, regularly occupied work area, or passageway, the underside of the conveyor shall be completely enclosed to prevent broken chains or other material from falling in the passageway or work area.
 - (b) Stop bumpers shall be installed on all delivery ends of conveyors, wherever manual removal of the product carried is practiced.
 - (c) All conveyors shall have stop buttons at all operating stations. In addition, emergency stop bars or switches shall be installed at any machine infeed location fed by the conveyor where pinch points exist.

WAC 296-302-050 (Cont.)

- (8) Overhead rail systems.
 - (a) Handles for operating devices for trolley switches which hang less than 6 feet 8 inches from the floor shall be of pliable material.
 - (b) Floor scales. Nonshatterable transparent material shall be used to cover dials.
- (9) Dough chutes. The entrance to the chute shall be guarded so as to protect the employee from falling into chute, stepping into chute, or tripping over too low an edge of the chute.
- (10) Skids.
 - (a) All sharp corners or edges shall be eliminated on all metal skids.
 - (b) All edges and corners shall be protected on skids to prevent exposed splinters.
- (11) Ingredient premixers, emulsifiers, etc.
 - (a) All top openings shall be provided with covers attached to the machines. These covers should be so arranged and interlocked that power will be shutoff whenever the cover is opened to a point where the operator's fingers might come in contact with the beaters.
 - (b) Portable electrical agitators for ingredient premixers shall have the attachment cord so wired that the agitator will be grounded whenever it is connected to a source of power.
- (12) Chain tackle.
 - (a) All chain tackle shall be marked prominently, permanently, and legibly with maximum load capacity.
 - (b) All chain tackle shall be marked permanently, and legibly with minimum support specification.
 - (c) Safety hooks shall be used.
- (13) Trough hoists, etc.
 - (a) All hoists shall be marked prominently, permanently, and legibly with maximum load capacity.
 - (b) All hoists shall be marked permanently and legibly with minimum support specifications.
 - (c) Safety catches shall be provided for the chain so that the chain will hold the load in any position.
 - (d) Safety hooks shall be used.
- (14) Air-conditioning units.
 - (a) All sharp corners and edges shall be eliminated.
 - (b) On large units with doors to chambers large enough to be entered, all door locks shall be operable from both inside and outside.

WAC 296-302-050 (Cont.)

- (15) Pan washing tanks.
 - (a) Counter-balanced hinged covers, or sliding covers, shall be provided.
 - (b) The surface of the floor of the working platform shall be maintained in nonslip condition.
 - (c) Working platforms shall be kept at least 32 inches below the top of the tank or guardrail.
 - (d) All electrical sockets in pan washing rooms shall be nonmetallic and keyless and other electrical equipment shall be moisture proof.
 - (e) Power ventilated exhaust hoods shall be provided over the tanks.
- (16) Pan washing machines. Sharp corners and edges shall be eliminated.
- (17) Cake depositors. All pinch points shall be eliminated, guarded, or shielded so that hands and arms cannot reach these pinch points while the machine is in operation.
- (18) Icing machines. All pinch points shall be eliminated, or provided with guards or shields so hands and arms cannot reach these pinch points while the machine is in operation.
- (19) Bread coolers, conveyor type.
 - (a) All pinch points shall be eliminated or guarded.
 - (b) Stop bumpers on all delivery ends of conveyors shall be installed wherever manual removal of the product carried is practiced.
- (20) Bread coolers, rack type.
 - (a) Guardrails shall be installed to the center rack as it enters and leaves the cooler.
 - (b) All door locks shall be operable from both within and outside the cooler.
- (21) Bread and cake boxes, trays, etc.
 - (a) Sharp corners and edges shall be eliminated on metal parts.
 - (b) All wooden corners and edges shall be protected to prevent splinters.
- (22) Doughnut machines. Separate flues shall be provided, (a) for venting vapors from the frying section, and (b) for venting products of combustion from the combustion chamber used to heat the fat.
- (23) Open fat kettles.
 - (a) The floor around kettles shall be maintained in nonslip condition.
 - (b) Fire extinguishing devices suitable for Class-B fires shall be provided. See WAC 296-800-300, fire extinguishers.

WAC 296-302-050 (Cont.)

- (c) Goggles or face shields shall be provided to prevent injuries from hot fat splashes.
 - (d) The top of the kettle shall be not less than 36 inches above floor or working level.
 - (24) Steam kettles.
 - (a) Positive locking devices shall be provided to hold kettles in the desired position.
 - (b) Kettles with steam jackets shall be provided with safety valves in accordance with ASME Pressure Vessel Code, section VIII, Unfired Pressure Vessels, 1968.
- [Statutory Authority: RCW 49.17.010, .040, .050. 01-11-038 (Order 99-36) § 296-302-050, filed 05/09/01, effective 09/01/01. Order 74-17, § 296-302-050, filed 5/6/74.]

WAC 296-302-05501 Slicers.

- (1) Sprockets, chains, and V-belt drives on slicers shall be completely enclosed.
- (2) All slicing machines shall be provided with a mechanical device to push the last loaf through the slicer knives.
- (3) The cover over the knife head of reciprocating-blade slicers shall be provided with an interlocking arrangement so that the machine cannot operate unless the cover is in place.
- (4) On slicers with endless band knives, each motor shall be equipped with a magnet brake which operates whenever the motor is not energized. Each door, panel, or other point of access to the cutting blades shall be arranged by means of mechanical or electric interlocks so that the motor will be de-energized if all such access doors, panels, or access points are not closed.
- (5) When it is necessary to sharpen slicer blades on the machine, a barrier shall be provided leaving only sufficient opening for the sharpening stone to reach the knife blades.
- (6) Where pusher fingers attached to the feed chain enter the bed plate of the cross feed, the end guard shall be extended to cover the pinch point.
- (7) Slicer wrapper conditions:
 - (a) Where the flight chain on the slicer turns under the bed plate on the crossfeed to the wrapper, a spring-hinged section of bed plate shall be provided so that there is no shear point between the flight chain and the bed plate.
 - (b) Wrapping and slicing machines obtained from separate manufacturers, shall be installed and connected so that the chains, sprockets, belts, and moving parts are guarded. Interconnections for the starting and stopping of such devices shall be employed.
 - (c) Mechanical control levers for starting and stopping both slicing machine conveyors and wrapping machines shall be extended or so located that an operator in one location can control both machines. Such levers should be provided wherever necessary, but these should be so arranged that there is only one station capable of starting the wrapping machine and conveyor assembly, and this starting station should be so arranged or guarded as to prevent accidental starting. The electric control station for starting and stopping the electric motor driving the wrapping machine and conveyor should be located near the clutch starting lever.

WAC 296-302-05501 (Cont.)

(d) The transfer chain shall be completely covered on all sides, not just on front and top.
[Order 74-17, § 296-302-05001, filed 5/6/74.]

WAC 296-302-05503 Wrappers.

- (1) Any hand wheel which may be provided in order to turn the wrapping machine over by hand and which may run continuously shall be a smooth, solid disk wheel.
- (2) At the discharge end (or drive side) of the crossfeed conveyor there shall be either a one- or two-piece guard in front of the crossfeed chain.
- (3) Electrical heaters on wrappers shall be protected by a cover plate properly separated or insulated from the heaters in order that accidental contact with this cover plate will not cause a burn to the operator.
- (4) Electric wiring for the wrapper heaters shall be so arranged that a minimum number of wires are used to connect the movable heaters assembly to the permanent wiring of the machine. This wiring shall be heat-resisting type in accordance with the requirements of the National Electrical Code - 1971 Edition.
- (5) Power-driven friction rollers used to feed paper into the wrapping machine shall be provided with a guard over the in-running nip point of the rubber rollers.
- (6) The nip point, between the chain and sprocket of the loose wrap attachment, shall be completely enclosed or guarded on both sides in such a way that employee's fingers cannot get into this nip point.
- (7) Sprocket, chain, and V-belt drives on wrappers shall be completely enclosed.
[Order 74-17, § 296-302-05003, filed 5/6/74.]

WAC 296-302-060 Biscuit and cracker equipment.

- (1) Metal, peanut, and fig grinders.
 - (a) If the hopper is removable it shall be provided with an electric interlock so that the machine cannot be put in operation when the hopper is removed.
 - (b) Where grid guards cannot be used, feed conveyors to hoppers, or baffle-type hoppers, shall be provided. Hoppers in such cases shall be enclosed and provided with hinged covers, and equipped with electric interlock to prevent operation of the machine with the cover open.
- (2) Sugar and spice pulverizers.
 - (a) All drive belts used in connection with sugar and spice pulverizers shall be grounded by means of metal combs or other effective means of removing static electricity. All pulverizing of sugar or spice grinding shall be done in accordance with NFPA 62-1967 (Standard for Dust Hazards of Sugar and Cocoa), NFPA 656-1959 (Standard for Dust Hazards in Spice Grinding Plants).
 - (b) Magnetic separators shall be provided to reduce fire and explosion hazards.
- (3) Cheese, fruit, and food cutters. These machines shall be protected in accordance with the requirements of (1) of this section.

WAC 296-302-060 (Cont.)

- (4) Jam, icing, and marshmallow beaters of horizontal tub type. All top openings shall be provided with covers attached to the machines.
- (5) Reversible dough brakes. Reversible brakes shall be provided with a guard or tripping mechanism on each side of the rolls. These guards shall be so arranged as to stop the machine or reverse the direction of the rolls so that they are outrunning if the guard is moved by contact of the operator.
- (6) Cross-roll brakes. Cross-roll brakes shall be provided with guards that are similar in number and equal in effectiveness to guards on hand-fed brakes.
- (7) Box- and roll-type dough sheeters.
 - (a) Sheetting rolls shall be guarded at the point where the dough enters the rolls so that the operator's fingers cannot get into the nip point.
 - (b) Hoppers for sheeters shall have an automatic stop bar or automatic stopping device along the back edge of the hopper. If construction does not permit location at the back edge, the automatic stop bar or automatic stopping device shall be located where it will be most effective to accomplish the desired protection.
- (8) Cutting and panning, embossing, peeling, bar, and frutana machines.
 - (a) Roll stands, other than hand fed, shall be guarded at the point where the dough enters the rolls so that the operator's fingers cannot get into the nip points.
 - (b) Guards shall be provided at each side of the cutter to prevent hands from getting under the cutter.
 - (c) Reciprocating panner heads shall be guarded to protect the operator from being caught between moving and stationary parts.
 - (d) Motor control buttons shall be located within view of the cutting head.
- (9) Rotary, die machines, pretzel rolling, and pretzel-stick extruding machines. Dough hoppers shall have the entire opening protected with grid-type guards to prevent the employee from getting his hands caught in moving parts, or the hopper shall be extended high enough so that the operator's hands cannot get into moving parts.
- (10) Band ovens. Band ovens shall be so arranged, or guarded, that the operator cannot get caught at the nip point between the band and the drive pulley or the takeup pulley, or between the oven conveyor and the oven frame.
- (11) Wafer-cutting machines. These machines shall be so guarded that it will be impossible for employee's fingers or hands to come in contact with the saws or knives while feeding the machine.
- (12) Pan cooling towers.
 - (a) Where pan cooling towers extend to two or more floors, a lockout switch shall be provided on each floor in order that mechanics working on the tower may positively lock the mechanism against starting. Only one start switch shall be used in the motor control circuit.

WAC 296-302-060 (Cont.)

- (b) All unused sides of pan cooling tower conveyors shall be enclosed or effectively guarded to a height of 7 feet above each floor.
 - (c) Wherever a pan cooling tower conveyor passes through a floor, the opening shall be protected by a standard railing and toeboard as defined by the general safety and health standard, chapter 296-24 WAC and safety and health core rules, chapter 296-800 WAC, or by other equivalent protection.
 - (d) Wherever a pan conveyor passes over a main aisleway, regularly occupied work area, or passageway, the underside of the conveyor shall be completely enclosed to prevent pans, broken chains, or other material from falling in the aisleway, work area or passageway.
 - (e) Sprocket wheels of pan conveyors shall be enclosed so that accidental contact cannot be made at the point where the chain comes in contact with the sprocket.
 - (f) Wherever conveyor bars, flights, and attachments pass in opposite directions within 6 inches of each other, a sheet metal partition or screen with openings no larger than one-half inch shall be placed between the conveyor chains which run in opposite directions.
- (13) Chocolate melting, refining, and mixing kettles. Each kettle shall be provided with a cover to enclose the top of the kettle. The bottom outlet of each kettle shall be of such size and shape that the operator cannot reach in to touch the revolving paddle or come in contact with the shear point between the paddle and the side of the kettle.
 - (14) Caddie, cover, and box stitchers (wire stitchers). A guard shall be mounted on the stitching head to prevent operators from getting fingers caught between the stitching head and the clincher block.
 - (15) Carton-wrapping and bundling machines. The end seal drums on carton and bundling machines shall be provided with guards.
 - (16) Carton and lining feeding machines. Cutting knives shall be provided with a hinged hood to cover the knives. These guards shall be electrically interlocked to stop the machine if they are removed.
 - (17) Peanut cooling trucks. Mechanically operated peanut cooling trucks shall have a grid-type cover over the entire top.

[Statutory Authority: RCW 49.17.010, .040, .050. 01-11-038 (Order 99-36) § 296-302-060, filed 05/09/01, effective 09/01/01. Order 74-17, § 296-302-060, filed 5/6/74.]

WAC 296-302-065 Ovens-Scope and application. All sections of this chapter which include WAC 296-302-065 in the section number, apply to ovens.
[Order 74-17, § 296-302-065, filed 5/6/74.]

WAC 296-302-06501 General location.

- (1) Ovens shall be located with due regard to the possibility of fire resulting from overheating or from the escape of gas or fuel oil and the possibility of injury to persons resulting from explosions.
- (2) Ovens shall be built on noncombustible foundations; excepting that where unusual circumstances require that an oven be placed on a combustible floor, the sole of the oven itself shall be insulated and shall be separated from the floor by a ventilated air space of at least 3 inches. In no case shall the temperature of a combustible floor beneath an oven be permitted to exceed 160°F.

- (3) Insulation shall be used in the crown of any oven, and the space above this crown shall be ventilated, to prevent the temperature of any combustible ceilings from rising above 200°F.

WAC 296-302-06501 (Cont.)

- (4) Where oven ducts or stacks pass through combustible walls or ceilings, sufficient clearance and insulation shall be provided to keep the temperature of combustible material below 160°F.
- (5) Columns or structural members of a building shall not pass through an oven. When such columns or structural members are closer than 6 inches to the inner shell of an oven, fireproof material shall be used and insulated in such a way that the temperature of the column or structural member will be kept below 160°F.
- (6) Ovens shall be located so as to be accessible from all sides and adequately spaced to permit the proper functioning of explosion vents.
- (7) Ovens shall be located so that possible fire or explosion will not expose groups of persons to possible injury. For this reason, ovens shall not adjoin lockers, lunch or sales rooms, main passageways, or exits.
[Order 74-17, § 296-302-06501, filed 5/6/74.]

WAC 296-302-06503 General requirements.

- (1) Protecting devices shall be maintained and kept in working order.
- (2) All safety devices on ovens shall be inspected at intervals of not less than twice a month by an especially appointed, properly instructed bakery employee, and not less than once a year by representatives of the oven manufacturers.
- (3) Protection of gas pilot lights shall be provided when it is impracticable to protect the main flame of the burner and where the pilot flame cannot contact the flame electrode without being in the path of the main flame of the burner.
 - (a) Failure of any gas pilot shall automatically shut off the fuel supply to the burner.
 - (b) Ovens with multiple burners shall be equipped with individual atmospheric pilot lights where there is sufficient secondary air in the baking chamber and where gas is available, or else each burner shall be equipped with an electric spark-type ignition device.
- (4) Burners of a capacity exceeding 150,000 b.t.u. per hour equipped with electric ignition shall be protected in addition by quick-acting combustion safeguards.
 - (a) The high-tension current for any electric spark-type ignition device shall originate in a power supply line which is interlocked with the fuel supply for the oven in such a way that in case of current failure both the source of electricity to the high-tension circuits and the fuel supply shall be turned off simultaneously.
 - (b) All electric circuits in connection with ignition systems on ovens shall comply with the National Electrical Code 1971 Edition.
 - (c) Combustion safeguards used in connection with electric ignition systems on ovens shall be so designed as to prevent an explosive mixture from accumulating inside the oven before ignition has taken place.
- (5) When fuel is supplied and used at line pressure, safety shutoff valves shall be provided in the fuel line leading to the burner.

WAC 296-302-06503 (Cont.)

- (a) When fuel is supplied in excess of line pressure, safety shutoff valves shall be provided in the fuel line leading to the burners, unless the fuel supply lines are equipped with other automatic valves which will prevent the flow of fuel when the compressing equipment is stopped.
 - (b) The safety shutoff valve shall be positively tight and shall be tested at least twice monthly.
 - (c) Packing glands shall be designed so that the valve will not be made inoperative by excessive tightening of the packing gland.
 - (d) Electrically operated safety shutoff valves shall be normally closed and not depend on electricity for shutting off the fuel supply.
 - (e) A safety shutoff valve shall require manual operation for reopening after it has closed, or the electric circuit shall be so arranged that it will require a manual operation for reopening the safety shutoff valve.
 - (f) Manual reset-type safety shutoff valves shall be so arranged that they cannot be locked in an open position by external means.
 - (g) Where blowers are used for supplying the air for combustion the safety shutoff valve shall be interlocked so that it will close in case of air failure.
 - (h) Where gas or electric ignition is used, the safety shutoff valve shall close in case of ignition failure. On burners equipped with combustion safeguards, the valve shall close in case of burner flame failure.
- (6) One main, manually operated, fuel shutoff valve shall be provided on each oven, and shall be located ahead of all other valves in the system.
- (7) All individual gas or oil burners with a heating capacity over 150,000 b.t.u. per hour shall be protected by a safeguard which is actuated by the flame and which will react to flame failure in a time interval not to exceed 2 seconds. All safeguards, once having shut down a gas or oil burner, shall require manual resetting and starting of the burner or burners.
- (8) Any space in an oven (except direct fired ovens) which could be filled with an explosive mixture shall be protected by explosion vents. Explosion vents shall be made of minimum weight consistent with insulation.
- (a) Explosion doors which have a weight shall be attached by chains or similar means to prevent flying parts from injuring the personnel in case of an explosion.
 - (b) Where explosion vents are so located that flying parts or gases might endanger the personnel working on or near the oven, internal or external protecting means shall be provided in the form of heavily constructed shields or deflectors made from noncombustible material.
 - (c) Specifically exempted from the provisions of these standards as contained in (8)(a) and (b) of this section are heating systems on ovens in which the fuel is admitted only to enclosed spaces, which shall have been tested to prove that their construction will resist repeated explosions without deformation.

WAC 296-302-06503 (Cont.)

- (9) Flues and dampers.
- (a) All ovens (except electrically heated) shall be properly and firmly connected to an active chimney or flue of ample size to carry away the flue gases.
 - (b) The chimney shall be preinspected after installation or repair to determine whether it is in suitable condition.
 - (c) The flue pipe or breaching shall be properly supported in all cases.
 - (d) Means shall be employed which will prevent the flue pipe or breeching from entering beyond the inner wall of the chimney flue.
 - (e) Flue pipe shall be cemented or otherwise sealed to the chimney wall so as to prevent infiltration of air.
 - (f) A flue damper or other equivalent means for regulating draft shall be installed on each oven, the proper operation of which depends on natural draft.
 - (g) Dampers, where used, shall be equipped with accessibly located minimum and maximum stops. The minimum stop for dampers shall be adjusted to obtain sufficient air for combustion at the minimum oven output. Where stack dampers are used in connection with oil- or gas-fired ovens, they shall be equipped with means to turn the burner off when the damper is closed.
- (10) Where the initial pressure of the fuel is lower than the air pressure used for combustion, check valves shall be installed in the fuel line to prevent air from backing up into the fuel lines. For instance, in gas burner apparatus, which uses air at pressures exceeding the gas service pressure, a check valve shall be provided in the gas line next to the mixing device.
- (11) Where the gas supply pressure is substantially higher than that at which the burners of an oven are designed to operate, a gas pressure regulator shall be employed.
- (a) Gas pressure regulators, where used, shall maintain the gas pressure to the manifold within 10 percent of the operating pressure from maximum to minimum consumption rates.
 - (b) Regulators shall be of the spring-loaded, dead-weight, or pressure-balanced type. Spring- or weight-loaded regulators shall have springs or weights covered by suitable housing. Under no circumstances shall a weight and lever type of regulator be used.
 - (c) A gas pressure regulator, requiring access to atmosphere for successful operation, shall be vented to the outer air.
 - (d) A relief valve shall be placed on the outlet side of gas pressure regulators where gas is supplied at high pressure. The discharge from this valve shall be piped to the outside of the building.
- (12) All chambers which have to be connected to the atmosphere, but are separated from any gaseous or other volatile fuel by a flexible membrane, as, for instance, a diaphragm, bellows, etc., shall be connected by a pipe of at least one-half inch size to the outside atmosphere. The outside end of this pipe shall be protected against flooding or accidental plugging by ice formation, insects, or other causes, by providing a "tee" with double elbow connections pointing downwards at the top of the pipe, and screened outlets. Where several of such chambers are used in close proximity, a common vent line may be used.

WAC 296-302-06503 (Cont.)

- (13) Where accumulation of dust in the air supply might affect the proper functioning of mixing devices and burners, the air supply inlet shall be equipped with suitable air filters. A standby filter should be available to permit interchanging filters for cleaning purposes.

[Order 74-17, § 296-302-06503, filed 5/6/74.]

WAC 296-302-06505 Construction.

- (1) Structural parts of ovens shall be protected against corrosion or deterioration.
- (2) Roofs and other parts of ovens shall be structurally strong enough to support the weight of persons who may be required to climb on top of ovens or inside of them.

[Order 74-17, § 296-302-06505, filed 5/6/74.]

WAC 296-302-06507 Safeguards of mechanical parts.

- (1) Emergency stop buttons shall be provided on mechanical ovens near the point where operators are stationed.
- (2) All piping at ovens shall be tested to be gastight.
- (a) Soldered pipe joints shall not be permitted in connection with ovens. Pipe joints may be either screwed, flanged, or welded, in connection with ovens where such pipes carry fuel or steam.
- (b) All pipe and fittings used shall be of such schedule which will safely carry the pressure and be clear and free from cutter burrs and defects in structure or threading.
- (3) Main shutoff valves, operable separately from any automatic valve, shall be provided to permit turning off the fuel or steam in case of an emergency.
- (a) Main shutoff valves shall be located so that explosions, fires, etc., will not prevent access to these valves.
- (b) Main shut off valves shall be locked in the closed position when persons must enter the over or when the oven is not in service.

[Order 74-17, § 296-302-06507, filed 5/6/74.]

WAC 296-302-06509 Gas-burning systems.

- (1) Liquefied petroleum gas shall be stored and distributed in accordance with the requirements of the general safety and health standards, chapter 296-24 WAC.
- (a) Inspirators on atmospheric (low-pressure) gas-burning systems shall be so constructed and machined as to ensure correct alignment of the gas jet with the axis of the inspirator. Air adjustments or shutters on inspirators on atmospheric gas-burning systems shall either be permanently fixed or else provided with a locking device to positively prevent accidental change of setting. The shutter shall be so located that adjustments can be made when the oven is in normal operating condition.
- (3) Dampers controlling the draft on ovens equipped with atmospheric gas-burning systems shall be interconnected with the gas supply so that no gas can be admitted to the burners if the damper is closed.

- (a) Atmospheric pipe burners extending into the baking chamber of ovens fired with atmospheric gas-burning systems shall have secondary air ducts installed below each burner and extending over its full length. Air inlets for these ducts shall be placed outside the baking chamber.

WAC 296-302-06509 (Cont.)

- (b) Stack dampers on ovens equipped with atmospheric gas-burning systems shall have a hole of the following diameter:

Diameter of Flue	Diameter of Opening
3 to 5	1/2
6 to 10	1
11 to 15	1/2

Dimensions given in inches.

- (4) Nozzle or blast burners on atmospheric gas-burning systems shall be equipped with gas pilots or electric ignition; with the exception that burners operated on a maximum-minimum flame or modulating principle which are equipped with quick acting combustion safeguards actuated by the main burner flame may be equipped with automatic or hand torch ignition to be used for initial lighting only.
- (5) Burners of the perforated pipe, ribbon, slot, tip, or similar types, having many individual ports, shall be capable of maintaining a stable flame over the entire length (or surface) of the burner throughout the turndown range and under all draft conditions which may arise in the operation of the oven, unless ignition of gas from every port shall immediately result from the ignition of gas at any single port, when gas is supplied to the burner at the highest and lowest rating of the burners.
- (6) Premixed gas burners shall be so designed that the burner will not backfire or blow off within the operating range of the burner.
- (a) Multiple port burners, such as ribbon, strip, or tip burners, when used on premixed gas systems, shall be capable of instant ignition of the burner over its entire length when operated within the proper range of the burner, either in a normal or steam-laden oven atmosphere or under any other oven conditions which might extinguish the flame.
- (b) Where a number of premixed gas burners are connected to a single premixing device, each burner shall be equipped with electric or gas ignition.
- (7) High-pressure inspirators (using gas at pressures exceeding 1 p.s.i.) shall be so constructed and machined as to insure perfect alignment of the gas jet with the axis of the inspirator.
- (a) No high-pressure inspirator shall be installed with a valve or other obstruction between the inspirator and the burner.
- (b) Each high-pressure inspirator shall have a gas adjustment consisting of a fixed replaceable orifice or an adjustable orifice. When an adjustable orifice is used, the adjusting screw shall be protected by a gas-tight plug.
- (c) Air adjustments on high-pressure inspirators shall be provided with positive locking means.
- (d) High-pressure inspirators shall be so located that air adjustments can be made during the operation of the oven.
- (e) High-pressure inspirators shall be mounted in such a position that should a backfire occur, it cannot injure the operator or ignite any combustible material.

WAC 296-302-06509 (Cont.)

- (f) High-pressure inspirators used on gas-burning systems, which are supplied under pressure with a partial mixture of air and gas instead of straight gas, shall not be used unless the amount of air mixed with the gas is sufficiently low to keep the mixture rich enough to be above the upper explosive limit.
- (g) Low-pressure proportioning inspirating sets (using air at pressures from one-half to 1 1/2 p.s.i. and gas at or about atmospheric pressure) shall be equipped with a positive locking device on the adjustment for setting the gas-air ratio.
- (8) Low-pressure proportioning inspirators equipped with zero governors, which do not compensate for any change in resistance in the mixture pipe, shall be installed so that there is no valve or other obstruction between the inspirators and the burners. Diaphragm air spaces of governors on low-pressure proportioning inspirating sets shall be vented to the outside of the building.
- (9) Two-pipe systems: No valve or other obstruction shall be placed between the mixing valve and the burners on any two-pipe system which uses air and gas under pressure, unless the mixing valve is equipped with a device which automatically will prevent excessive pressure rise in the mixture pressures. Two-pipe systems shall be equipped with means for cleaning the air and gas before they enter the mixing valve.

[Order 74-17, § 296-302-06509, filed 5/6/74.]

WAC 296-302-06511 Gas mixing machines.

- (1) All burners supplied with complete mixture from the machine shall be equipped with flash and flame arrestors equipped with automatic shutoff valves actuated by heat. These controls shall be installed as close to the burners as practical and also at the outlet of the premixing machine ahead of the individual burner shutoffs to prevent the flame from reaching the mixture supply pipe.
 - (a) The main mixture lines and the gas machine proper shall be amply protected against fire or explosion hazard by flashback arrestors and relief vents or soffheads located outside the building. Some gas mixing machines are used for partially premixing gas and air and supplying this mixture to high-pressure inspirators where additional air is entrained. If the gas-air ratio is such that the mixture remains so rich as to be above the upper explosive limit over the entire range of the machine, flash arrestors or explosion vents are not required. Positive means shall be provided which will prevent any such gas mixing machine from producing an explosive mixture.
 - (b) All diaphragm or similar chambers shall be connected to the atmosphere outside of the building.
 - (c) An automatic safety shutoff valve shall be provided in the gas line leading to the mixing valve which will close the gas supply in case the suction disappears at the compressor inlet or the current to the compressor is shutoff.
 - (d) Air inlets to gas mixing machines shall be piped to a location outside the building and shall be located at a point protected against dust.
- (2) No valve or obstruction shall be installed between mixing blowers and burners.
 - (a) Mixing blowers shall be so constructed that they will supply a mixture of air and gas that will not blow off or backfire over the entire range of adjustments.

WAC 296-302-06511 (Cont.)

- (b) Mixing blowers shall be provided with a pressure regulator in the gas line at the inlet to the mixing valve (to prevent variations in the air-gas ratio).
- (c) Housings of mixing blowers shall be constructed to withstand any possible internal explosion.
- (d) Mixing blowers shall be provided with an automatic safety shutoff valve in the gas line leading to the blower, which the safety shutoff valve will close in case of failure of either gas pressure or electric current.

[Order 74-17, § 296-302-06511, filed 5/6/74.]

WAC 296-302-06513 Oil-burning equipment.

- (1) The storage and distribution of fuel oil in bakeries shall be arranged according to reference NFPA 31-1968 Standard for Installation of Oil Burning Equipment.
- (2) Oil burners shall be of a type approved by Underwriters' Laboratories, Inc. (See WAC 296-800-360, using standards from outside organizations.)
 - (a) Each oil burner shall be equipped with an electric ignition or gas pilot.
 - (b) Oil burners shall be protected against flame failure and overflowing of oil by a quick-acting combustion safeguard operated by the main burner flame. The time interval between flame failure and fuel shutoff shall be short enough to prevent a dangerous accumulation of an explosive mixture or the entry of a dangerous amount of fuel oil into the heating system; with the exception that on ovens requiring 150,000 b.t.u. per hour or less any combustion safeguard listed by the Underwriters Laboratories, Inc., may be used. (See WAC 296-24-006, of the general safety and health standards.)
 - (c) The shutting off of the fuel supply shall be accomplished by stopping the individual burner pump equipped with a pressure cutoff valve, or by closing a suitable valve.
 - (d) Oil-fired ovens shall have dampers so arranged that a small amount of air is passed through the furnace at all times.
 - (e) Oil burners capable of being withdrawn from the furnace (for adjustment, etc.) shall be provided with an interlock which will prevent the burner from starting when in the withdrawn position.
 - (f) Preheating of oil, where necessary, shall be done by steam, hot water, or electric heater, and shall be thermostatically controlled. Heaters shall be substantially constructed with all joints made oil tight. Thermometers shall be installed at accessible locations to indicate the temperature of the heated oil. Heaters shall be bypassed or provided with means to prevent abnormal pressure.
 - (g) Oil burners equipped with mechanical means for supplying air shall have an interlock between the air pressure and the oil supply so that the burner cannot operate unless air for proper combustion is available.
- (3) High-pressure atomizing oil burners shall be provided with a pressure cutoff valve between the pump and the nozzle.

WAC 296-302-06513 (Cont.)

- (4) Air atomizing burners equipped with maximum-minimum or modulating controls, and which are arranged to have the ignition turned off after initial lighting has been accomplished, shall be equipped with a quick-acting flame safeguard directly actuated by the main flame of the burner.
- (5) Mechanical atomizing burners of the rotary type shall be operated on the on-off principle and shall be equipped with safeguards actuated by the main flame.
- (6) Evaporator-type burners shall be installed in such a way that provision is made to open the draft damper before oil can be admitted to the burners.
- (7) Burners supplied by "vapofiers" shall be equipped with a protective gas or electric pilot. In combination vaporier-gas heating systems, the burner shall be protected in accordance with the requirements of WAC 296-302-06509.

[Statutory Authority: RCW 49.17.010, .040, .050. 01-11-038 (Order 99-36) § 296-302-06513, filed 05/09/01, effective 09/01/01. Order 74-17, § 296-302-06513, filed 5/6/74.]

WAC 296-302-06515 Solid-fuel firing equipment.

- (1) In solid-fuel firing systems proper draft shall be maintained at the stack as long as there is fuel in the furnace. All breachings and flues shall be kept in a tight and clean condition. Solid-fuel firing systems using forced draft shall have the air supply to the ash pit interconnected with the furnace in such a way that the air pressure is shut off when the furnace door is opened.
- (2) Mechanical stokers.
 - (a) Fuel feed and air supply to mechanical stokers shall be interlocked in such a way that fuel cannot be fed without sufficient air being available.
 - (b) Dampers in mechanical-stoker fired systems shall be interlocked with the stoker in such a way that the stoker cannot be started unless the damper is open.

[Order 74-17, § 296-302-06515, filed 5/6/74.]

WAC 296-302-06517 Electrical heating equipment.

- (1) All electrical equipment shall be built and installed according to the National Electric Code - 1971 edition.
- (2) Open heating elements inside the baking chamber shall be guarded against accidental touching by the product being baked, by the body of the operator, or by current-conducting implements which may be used.
- (3) A main disconnect switch or circuit breaker shall be provided. This switch or circuit breaker shall be so located that it can be reached quickly and safely. The main switch or circuit breaker shall have provisions for locking it in the open position if any work on the electrical equipment or inside the oven must be performed.

[Order 74-17, § 296-302-06517, filed 5/6/74.]

WAC 296-302-06519 Direct-fired ovens.

- (1) Direct-fired ovens shall be safeguarded against failure of fuel, air, or ignition.

WAC 296-302-06519 (Cont.)

- (2) To prevent the possible accumulation of explosive gases from being ignited after a shutdown, all direct-fired ovens with a heating capacity over 150,000 b.t.u. per hour shall be ventilated before the ignition system, combustion air blower, and the fuel can be turned on. The preventilation shall insure at least four complete changes of atmosphere in the baking chamber by discharging the oven atmosphere to the outside of the building and entraining fresh air into it. The preventilation shall be repeated whenever the heating equipment is shut down by a safety device.

[Order 74-17, § 296-302-06519, filed 5/6/74.]

WAC 296-302-06521 Direct recirculating ovens.

- (1) Each circulating fan in direct recirculating ovens shall be interconnected with the burner in such a manner that the fuel is shut off by a safety valve when the fan is not running .
- (2) The flame of the burner or burners in direct recirculating ovens shall be protected by a quick-acting flame-sensitive safeguard which will automatically shut off the fuel supply in case of burner failure.
- (3) Direct recirculating ovens shall be equipped with preventilating devices.
- (4) Fans in direct recirculating ovens shall be constructed of materials suitable for the temperatures at which they will operate and designed with an ample safety factor to prevent rupture of the wheel.
- (5) Fan wheel in direct recirculating oven shall be protected against direct impingement of the flame of the burner or burners.
- (6) Direct recirculating ovens, and particularly fans in and on such ovens, shall be protected from overheating by means of a temperature limiting device.
- (7) When the burner or burners on direct recirculating ovens are mounted at elevated positions permanent steps shall be provided for safe and convenient access to the burner or burners.

[Order 74-17, § 296-302-06521, filed 5/6/74.]

WAC 296-302-06523 Flue-type ovens.

- (1) Flue-type ovens shall be operated in such a way that less than atmospheric pressure is maintained in the flues.
- (2) Gas burners in flue-type ovens shall be protected against flame failure.
- (3) Oil burners on flue-type ovens shall be equipped with combustion safeguards as listed by the Underwriters Laboratories, Inc.
- (4) Solid-fuel stoker-fired flue-type ovens shall have the stack damper interlocked with the stoker so that the stoker cannot be operated when the damper is closed.

[Order 74-17, § 296-302-06523, filed 5/6/74.]

WAC 296-302-06525 Indirect-fired multiple burner ovens.

- (1) Indirect-fired multiple-burner ovens shall be equipped with safety shutoff valves which are interlocked with the ignition system, the air pressure and the gas pressure.
- (2) Parts of enclosures reaching through the wall of indirect-fired multiple-burner ovens, and observation windows on such ovens, shall be tested at least once each year with repeated explosions, and afterward inspected for leaks.

[Order 74-17, § 296-302-06525, filed 5/6/74.]

WAC 296-302-06527 Steam-tube ovens. Steam-tube ovens shall be protected against overfiring (firing at an excessive rate) and overheating (heating to excessive temperatures) by devices which control the maximum amount of fuel admitted to the furnace and the maximum permissible temperature in the baking chamber.
[Order 74-17, § 296-302-06527, filed 5/6/74.]

WAC 296-302-06529 Indirect recirculating ovens.

- (1) Indirect recirculating ovens shall have all oil and gas burners equipped with quick-acting flame sensitive combustion safeguards.
- (2) Duct systems in indirect-recirculating ovens shall be protected by explosion vents having a minimum total area of 1 square foot of vent to 15 cubic feet of total duct volume. These explosion vents shall be so located that they will not release hot gases or flying parts in the direction of an operator.
- (3) Duct systems (in ovens) operating under pressure shall be tested for tightness in the initial starting of the oven and also at intervals not farther apart than 6 months.
- (4) Fans and other parts in indirect recirculating ovens shall comply with requirements as listed under WAC 296-302-06521.

[Order 74-17, § 296-302-06529, filed 5/6/74.]

WAC 296-302-06531 Electric ovens. Electric ovens shall be installed, operated, and maintained in accordance with the National Electrical Code - 1971 edition.
[Order 74-17, § 296-302-06531, filed 5/6/74.]